

PART 586 - IRRIGATION SYSTEM, TAILWATER RECOVERY - 447

\$KS586.00 Design Criteria

The design should be developed in accordance with the criteria listed in the Kansas Standard and Specifications for Irrigation System, Tailwater Recovery - 447 and the procedures outlined in Part 9 of the Kansas Irrigation Guide. It should be as shown on the Irrigation Development Plan, Form KS-ENG-440A or B.

\$KS586.01 Design

(a) Use Field Sheet: Irrigation System, Tailwater Recovery - 447, Form KS-ENG-9 and design as follows:

(1) Determine if the system will be intermittent or continuous pump-back and check the appropriate block. Condition A is intermittent and Condition B is continuous.

(2) List the crop, field slope, soil, intake family, and row spacing of the irrigation system.

(3) Determine and record the number of sets (N) to be irrigated with pump-back water per pump-back cycle.

(4) List the pump-back time (T_i) as listed in Part 4 of the Kansas Irrigation Guide or operating schedule as listed in Table 6.12.

(5) Determine whether pump-back water will enter the pit.

(6) Compute the volume of storage needed (V_s) for the condition selected (A or B). Follow the procedure noted in §586.00.

(7) Compute the estimated volume of excavation (V_e). With this volume, determine the pit dimensions which will best fit the site using Tables 9.5 through 9.9, Part 9, of the Kansas Irrigation Guide.

(8) List the design dimensions selected.

(9) Sketch in the plan view of the system. Show location of the tailwater pit, inlet structure, return pipeline, direction of irrigation, field drainage, and irrigation well or water source.

(10) Make the design and prepare the plans for the inlet structure in accordance with the criteria in Chapter 6 of the Engineering Field Manual and Part 582 of the Kansas Note Keeping and Documentation Manual (KNKDM).

\$KS586.02 Layout

(a) Use the Design Layout section on the reverse side of Form KS-ENG-9:

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- (1) List the benchmark elevation and description.
- (2) Record the elevations developed for the design spillway, design berm, design inlet, field level, and the design bottom in the design layout survey block.
- (3) Stake out the pit and record the dimensions and grade rods as appropriate on the design layout view.
- (4) Compute the excavated yardage by filling out the section at the bottom of the field sheet. The excavation pit yardage volume portion need not be filled out if printer output or photocopy from approved program-mable calculator or computer program is attached. Proper notation shall be made on the field sheet if this method is used.
- (5) Show the date and the person doing the layout.

§KS586.03 Checkout

- (a) Use the Construction Checkout section of Form KS-ENG-9:
 - (1) Record the elevations of items listed in the checkout survey block.
 - (2) Measure dimensions and take grade rods. Record this information on the pit and embankment checkout sketch.
 - (3) Show the date and the signature of the person responsible for making the checkout.
- (b) Fill out the applicable structure plan sheet in accordance with the instructions in §582.02 of the Kansas Note Keeping and Documentation Manual (KNKDM).

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§586.04 Sample of Form KS-ENG-9

USDA FIELD SHEET: IRRIGATION SYSTEM, TAILWATER
SCS RECOVERY - 447

KS-ENG-9
Rev. 9/79

Owner Example Ident. No. _____

Legal Description _____ County _____

PIT DESIGN INFORMATION

System is continuous ☐ or
intermittent ☒. Check one.

Crop Corn Field Slope 0.2%

Soil Richfield sl Int. Fam. 0.3

Row Spacing 40 in. N 2

$T_i = 16.3$ hrs. Q 1,000 gpm

Pump-back tailwater (will)
(~~will not~~) enter the pit.

Condition A

$$T_p = NT_i = 2 \times 16.3 = 32.6 \text{ hrs.}$$

$$C_a = 0.6 \quad q = C_a Q$$

$$q = 0.6 \times 1,000 = 600 \text{ gpm}$$

$$\% = 0.20 \quad \%* = 0.20$$

$$V_s = \frac{q - (\%Q + \%*q)}{450} \times T_p$$

$$V_s = 20.3 \text{ ac. in.}$$

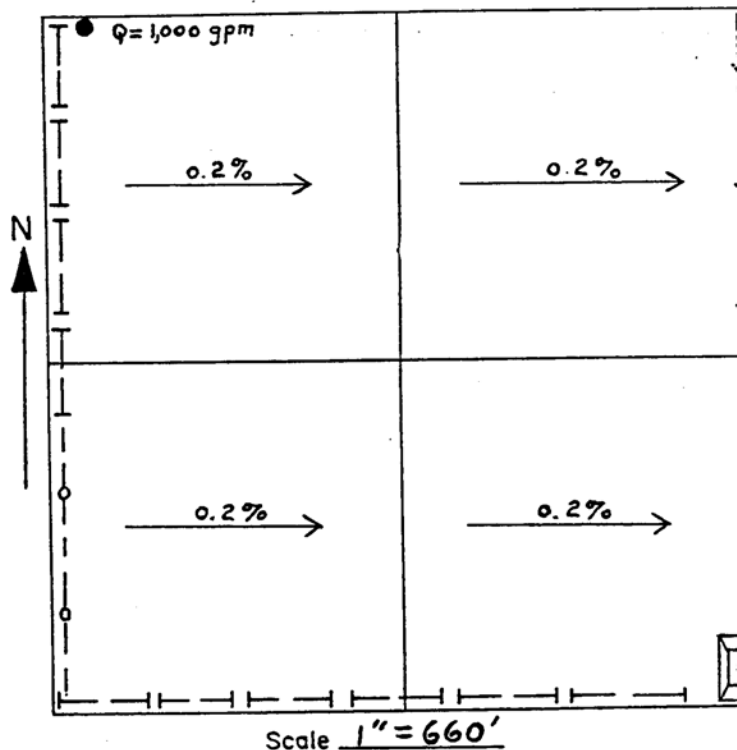
Condition B

$$C_b = \quad q = C_b Q$$

$$q = \quad \times \quad = \quad \text{gpm}$$

$$V_s = \frac{\%QT_i}{450} = \quad \text{ac. in.}$$

Note: See design procedure in
Part 9 of the Kansas Irrigation
Guide



$$V_e = 175 V_s = 175 \times 20.3 = 3,553 \text{ c.y. (est.)}$$

Determine pit dimensions using Tables
9.5 through 9.9 in Part 9 of the Kansas
Irrigation Guide.

Minimum depth = 7 ft.

Design dimensions Depth = 8 ft.

Width = 50 ft. Length = 118 ft.

Slopes, Ends 6:1, Sides 3:1
4:1

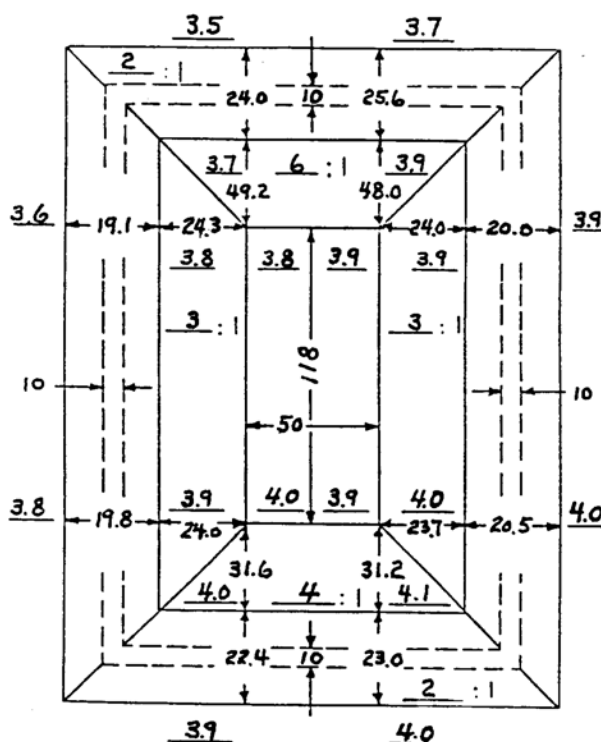
Remarks Locate inlet pipe on east side of pit as shown

Layout by Example Title _____ Date _____

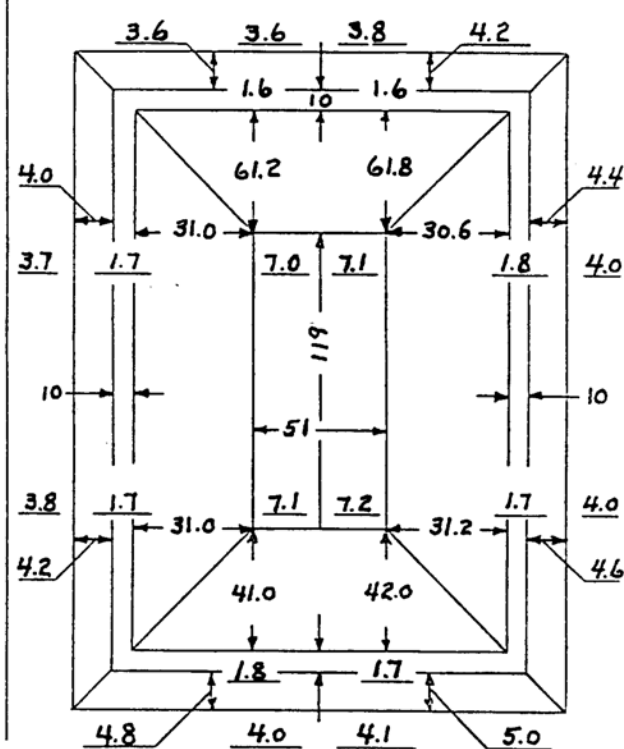
Checkout by _____ Title _____ Date _____

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§586.04-2

DESIGN LAYOUT



CONSTRUCTION CHECKOUT



Show pipe location

	B.S.	H.I.	F.S.	ELEV.
B.M.	2.9	52.9		50.0
Des. splwy.			3.9	49.0
Des. berm			1.9	51.0
Des. inlet			4.9	48.0
Field or TP			3.9	49.0
Des. bot.			11.9	41.0

N

	B.S.	H.I.	F.S.	ELEV.
B.M.	3.0	53.0		50.0
Splwy. ck.			4.0	49.0
Berm min.			1.8	51.2
Inlet inv.			5.0	48.0
Field or TP	2.1	48.1	7.0	46.0
Bot. ck.			7.1	41.0

Bench mark elev. 50.0, Description Top of Steel Pin @ Base of Corner Post

EXCAVATION PIT YARDAGE VOLUME

Total of top lengths 396 ft. Total of top widths 196 ft.
Average top length 198 ft. Average top width 98 ft.
Top area = (Av. L.) 198 x (Av. W.) 98 = 19,404 sq. ft.
Bottom area = (Av. L.) 118 x (Av. W.) 50 = 5,900 sq. ft.
*4 median area = (Sum L.) 316 x (Sum W.) 148 = 46,768 sq. ft.
*Add top and bottom av. lengths and widths
Sum = 72,072 sq. ft.
Volume = $\frac{\text{av. depth} \times \text{sum of areas}}{162} = \frac{8.0 \times 72,072}{162} = \underline{3,559}$ cu. yd.

